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SCIENCE NEWS LETTER



THE WEEKLY SUMMARY OF CURRENT SCIENCE



Crystallized Virus

See Page 371

A SCIENCE SERVICE PUBLICATION

GENERAL SCIENCE

Fight Fisheries Move

Conservationists voice strong opposition both to legislative and executive plans to remove present fisheries functions of Fish and Wildlife Service, charging proposals are political.

► THE NATION'S CONSERVATIONISTS have fired a double-barreled shotgun point blank at the President and Congress.

They charge that, under the thin guise of trying to save the country's commercial fishing industry, both Republicans and Democrats are playing politics. The result, they state, will be to set sport fishing and wildlife conservation back 15 years.

The reason why the conservationists, who normally shun weapons of all kinds, are up in arms is a sudden race between the legislators and the Administration to divorce the fish from Fish and Wildlife.

The Senate, they point out, has already passed a bill jointly sponsored by Senator Warren G. Magnuson (D-Wash.) and Senator Thomas H. Kuchel (R-Calif.) that would create a semi-independent Fisheries Commission within the Department of Interior and transfer to it all fisheries functions of the present Fish and Wildlife Service.

"The Eisenhower Administration," the conservationists pointed out, "has countered with a plan to set up a separate Bureau of Fisheries by executive order. A press release from the White House said the reorganization would take place July 1."

Nine national conservation organizations have gone on record opposing either of these plans. They say both are designed to win votes and Senate seats rather than to help the commercial fishermen.

The conservationists heatedly said that the sport fisherman in the United States will become an "orphan," and a "step-child" if either plan is adopted. They foresee the cost of sport fishing doubling. They also foresee the destruction of several marine mammals such as the hair seal, walrus and Beluga whale if either plan is put into motion, because these mammals would come under the administration of the commercial fisheries people who consider the mammals no more than predators.

The solution, the conservationists pointed out, is not to reverse the progress made in the United States towards an integrated program of conservation but, rather, to tackle the commercial fisherman's plight at the roots. The economic ills besetting the commercial fisherman, they said, stem largely from "American foreign policy and reciprocal trade agreements which permit unrestricted imports of Japanese tuna and certain other foreign fishery products," and "over-fishing and depletion of the resources by the industry itself."

In a statement, the nine organizations said, "we have been and remain unalterably opposed to a separation of fisheries from wildlife. We have been and remain

unalterably opposed to a split between commercial fisheries and sport fisheries."

The statement was signed by the executive officers of the Citizens Committee on Natural Resources, the Forest Conservation Society of America, the National Parks Association, the National Wildlife Federation, the Outdoor Writers Association of America, the Public Affairs Institute, the Sport Fishing Institute, the Wilderness Society and the Wildlife Management Institute.

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BIOLOGY

Tip-Toeing Rats Found in Africa

► RATS THAT WALK like men have been collected in the North African desert by Dr. Henry W. Setzer of the Smithsonian Institution.

Known as jerboas, the biped rats are seven to eight inches long and have long bushy tails. Ordinarily, they get around like kangaroos. For a living, the jerboas gather seeds after a heavy rain when the desert comes to blossom suddenly, then they store the seeds underground.

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MEDICINE

Protection for Arthritis

► EXISTENCE of a watch-dog committee to help protect arthritis sufferers from being exploited by quacks was announced by Dr. L. Maxwell Lockie of Buffalo at the American Rheumatism Association meeting in Chicago. This was the first public announcement of the committee.

The committee, set up by the association, works with the U. S. Food and Drug Administration. It gathers evidence required by law to develop a case that will hold up in the courts against a misbranded drug or device sold as a cure or a treatment for arthritis and rheumatism.

Members of the committee do this through controlled clinical evaluations to show by objective criteria that the products in question have no value.

"There is no cure for arthritis," Dr. Lockie said. "We doctors in the field of arthritis know of none. Every person with the disease should be very suspicious of any remedy or procedure that is advertised or represented as being a cure for the disease.

"Many new and worthwhile drugs do appear from time to time as a result of

• RADIO

Saturday, June 23, 1956, 1:45-2:00 p.m. EDT
"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Harold A. Edgerton, Richardson, Bellows, Henry & Co., Industrial Consultants, New York, will discuss "Picking People."

TECHNOLOGY

Combine Old and New Food Storage Methods

► THE WORLD'S OLDEST and newest methods for keeping food from spoiling have been combined, the American Society of Refrigerating Engineers meeting in Cincinnati was told.

Refrigeration and atomic radiation by gamma rays have been joined to preserve food by scientists at the University of Michigan, Dr. L. E. Brownell, supervisor of the University's fission products laboratory, reported. The new food storage method is called "high radio-pasteurization."

The use of high radio pasteurization, Dr. Brownell said, would mean a greater use of refrigeration in both the home and industry. Housewives, he said, might use an additional refrigerator solely for foods that are going to be kept for two to three months or longer.

Foods treated with refrigeration and radiation can be stored at temperatures of 40 degrees Fahrenheit, which would be cheaper than storage at home freezer temperatures. The treatment also eliminates the thawing period before cooking.

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extensive research in the field. But even these drugs, potent as some of them may be, are not cures for arthritis. At best, and when used properly by a physician, they will do little more than lessen the pain, stiffness, and discomfort associated with the disease."

Among the many examples of quack cures and bogus remedies, now out of business, listed by Dr. Lockie, were:

1. A pair of metal plates, one of copper and the other of zinc, to be worn inside a person's socks and which supposedly set up an electrical current that was to benefit the arthritis sufferer.

2. A packaged product of natural vegetation that on its label claimed it was good for rheumatic aches and pains. Analysis of the product proved it was nothing more than peat the promoter was digging from a peat bog near his home.

3. Mineral water sold at \$20 a gallon on the West Coast for arthritis treatment. Analysis proved it was a bit of the Pacific Ocean with a dash of potassium iodide.

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MEDICINE

Coxsackie Virus Crystals

Scientists at National Institutes of Health obtain pure crystals of Coxsackie virus from muscle tissue, the first such ever made and the second virus to be crystallized.

See Front Cover

► PURE CRYSTALS of a virus of the Coxsackie group have been obtained for the first time by Drs. Carl F. T. Mattern and Herman G. du Buy at the National Institute of Allergy and Infectious Diseases, Bethesda, Md.

This is the second animal virus ever obtained in pure crystalline form. The first was the polio virus crystallized by Dr. Wendell Stanley and associates of the University of California. (See SNL, Nov. 12, 1955, p. 310.)

The Coxsackie virus crystals are the first ever obtained from muscle tissue. The polio virus crystals were obtained from tissue culture.

Coxsackie viruses, first discovered in 1948 in Coxsackie, N. Y., are very prevalent in children during warm weather. They cause fever, sore throat, and pain in the neck, arms and legs.

Because the symptoms are like beginning polio and because the viruses are around during the polio season, the illnesses they cause have often been confused with polio and diagnosed as non-paralytic polio. When an outbreak of one of the Coxsackie diseases and a polio outbreak hit the same community at the same time, it may be almost impossible "to unscramble" the cases and tell which was which, one authority points out.

Coxsackie virus sicknesses are not fatal and are usually over in a few days. Some infected persons may not show any symptoms.

Now that pure crystals of the Coxsackie virus can be obtained, scientists see possibilities of separating out the infectious part, or antigen, and perhaps creating a vaccine against it. Tests to determine whether or not a child is immune to the virus may also be developed in the future.

Chemical studies of the virus are now also a future possibility.

The Coxsackie virus crystals are seen in the upper portion of the photograph on the cover of this week's SCIENCE NEWS LETTER. The amorphous material in the lower part of the picture is made of pellets of virus from which the crystals form. The crystals are unstable when dried and disintegrate in air, but remain crystalline if kept in their mother liquor.

The virus crystals were obtained in a series of manipulations starting with the A-10 strain virus grown in suckling mice. It took thousands of mice to get a tiny bit of the crystals, an amount that by weight would be less than two-tenths of a grain. A hundred litters of eight mice

each was needed each week for five months to get the tiny bit of virus crystals. In the ten quarts, roughly of starting material, one-third was muscle. Details of the method are reported in *Science* (June 8).

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VITAL STATISTICS

5 A.M. Peak Hour For Baby Births

► MOTHERS, FATHERS and the doctors who deliver babies are right when they say that early morning is the time babies favor for being born.

The peak hour for baby births is 5 a.m., Dr. Peter D. King of Warren State Hospital, Warren, Pa., finds from a study of the hours of birth of 33,215 babies in five hospitals over periods of one to eight years.

At 5 a.m., there are 48% more births than at the low hour of 7 p.m. There were 1,632 babies born at 5 a.m. and 1,103 born at 7 p.m.

Comparing numbers of births during the day, from 6 a.m. to 6 p.m., with births during the corresponding 12 night hours, as another scientist has done, shows almost as many babies born during the day as during the night, Dr. King reports.

If birth time is charted hourly, however, the morning hours from 3 a.m. to 11 a.m. show larger numbers each hour than the other eight-hour periods, 11 a.m. to 3 p.m. and 11 p.m. to 3 a.m., and 3 p.m. to 11 p.m.

Each of the five hospitals showed the same peak hour for births as the group as a whole did.

Interestingly, Dr. King points out, another scientist has reported that 62% of labors begin between 9 p.m. and 9 a.m. The midpoint of this period is four hours before the midpoint of the peak period of birth, Dr. King found.

The hospitals whose hourly birth records he studied are Edward W. Sparrow Hospital, Lansing, Mich.; St. Lawrence Hospital, Lansing, Mich.; Women's Christian Association Hospital, and Jamestown General Hospital, Jamestown, N. Y., and Warren General Hospital, Warren, Pa.

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HIGH SCHOOL TEACHER HONORED—For his outstanding leadership in guiding students into careers in engineering and science and for excellent high school teaching, Lon H. Colborn of Pittsburgh's Taylor Allardice High School was this year awarded an honorary master of science degree from Carnegie Institute of Technology, Pittsburgh. Of 357 students who took a special chemistry course he instituted in 1933, 332 of them have gone on to college. Three were Westinghouse Science Talent Search winners and another 18 received honorable mention in this nationwide search for top young scientists. In the picture, Dr. Colborn, center, is receiving congratulations from Richard King Mellon, financier-philanthropist, while Adm. Lewis L. Strauss, Atomic Energy Commission chairman, watches. Mr. Mellon and Adm. Strauss also received honorary degrees.

PUBLIC HEALTH

Costs of Syphilis Tests

► A TEST for syphilis can cost from 10 cents to \$35, depending on where done and the kind of test.

For the usual serological blood test done in public health laboratories all over the U. S., the cost per test is 10 to 50 cents, depending on the number of tests run by the laboratory.

The \$35 price is charged by a commercial laboratory for a TPI test, the letters meaning *Treponema Pallida Immobilization*. The laboratory, located in Philadelphia, is the only commercial one doing this test. Even at the \$35 per test figure, the laboratory is reported to be "losing its shirt" and wishes it could get out of this test business.

Among reasons for the high cost is the need to use live rabbits in which to grow the spirochetes.

In between the 10-cent and the \$35 tests is another, called TPCF, which costs about \$1 per test. The letters TPCF mean *Treponema Pallida Complement Fixation*.

The serological tests, of which the old Wassermann is perhaps the best known, are considered among the most accurate of laboratory tests for any disease. At present the serological tests most often used are the Kahn and the VDRL, named for the Public Health Service's Venereal Disease Research Laboratories. For premarital, prenatal, Armed Forces induction and public health population screening tests, these are considered adequate. They are based on the fact that syphilis, as most other infectious diseases do, develops several antibodies in the patient's body. One of these is called reagin and that is what the serological tests detect.

In population groups where there is very

little syphilis, these tests occasionally give a false positive reaction. In such cases, the TPI or TPCF test might be used. The U. S. Navy since 1951 has required a TPI test for personnel suspected of having syphilis and giving a doubtful or positive serological test.

This test is based on the differential reaction of live syphilis spirochetes, cultured in rabbit testes, to serum from a person who has had syphilis compared to that from a person who has not had it.

The TPCF test is based on the blood serum reaction with a protein fraction from the spirochete instead of a synthetic protein as used in the older serological tests.

This latter test or one like it may in two or three years be used by state health department laboratories.

Sidewalk Blood Tests

► POSSIBLY UNIQUE in mass disease detection methods is the sidewalk blood testing for syphilis carried on in Philadelphia. Known as "Operation Streetcorner," it was conducted in three areas known to have a high prevalence of the disease.

The testing was made at street corners of heavy pedestrian traffic for eight weeks. During this time 35,282 persons got blood tests. Of these, 11% were reactive.

From this and a second blood testing program known as "Operation Doorbell," in which 8,892 persons were tested, a total of 1,798 persons were discovered who needed treatment for syphilis.

The two programs were reported by Dr. John William Lenz of the Department of Public Health, Philadelphia.

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the people seek out a holy-mouth-man once or twice a year. These practitioners have an impressive set of paraphernalia, consisting of a variety of augers, awls, probes and prods. The use of these objects in the exorcism of the evils of the mouth involves almost unbelievable ritual torture of the client.

"The purpose of these ministrations is to arrest decay and to draw friends. The extremely sacred and traditional character of the rite is evident in the fact that the natives return to the holy-mouth-men year after year, despite the fact that their teeth continue to decay."

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ANTHROPOLOGY

U. S. Society Described

► A DESCRIPTION of people in the United States in the manner of anthropologists describing primitive people by Dr. Horace Miner of the University of Michigan appears in *American Anthropologist* (June).

This "as yet undescribed tribe" he calls "Nacirema." (Try reading it backward.)

"Nacirema culture is characterized by a highly developed market economy," Dr. Miner reports, "which has evolved in a rich natural habitat. While much of the people's time is devoted to economic pursuits, a large part of the fruits of these labors and a considerable portion of the day are spent in ritual activity, the focus of which is the human body, the appearance and health of which loom as a dominant concern in the ethos of the people."

Each home, he says, has at least one shrine devoted to these rituals. Center of

the shrine is a "charm box" built into the wall. This box is usually full to overflowing with magical packets of curative drugs. Beneath the charm box is a font.

Each day every member of the family in turn enters the shrine room, bows his head before the charm box and proceeds with a brief rite of ablution.

The daily body ritual performed by everyone includes a mouth-rite. Despite the fact that these people are so punctilious about care of the mouth, this rite involves a practice which strikes the uninitiated stranger as revolting.

"It was reported to me that the ritual consists of inserting a small bundle of hog hairs into the mouth, along with certain magical powders, and then moving the bundle in a highly formalized series of gestures," Dr. Miner says.

"In addition to the private mouth-rite,

MEDICINE

Leukemia Deaths Rise

Death rate of persons with leukemia is six times that of 100 years ago. Search for cause of this blood cancer is turning to consideration of factors within the body.

► LEUKEMIA is killing people in the United States at six times the rate of a century ago, Dr. Michael B. Shimkin of the National Cancer Institute reported at the Third National Cancer Conference, held in Detroit, under the sponsorship of the National Cancer Institute and the American Cancer Society.

Death rates for leukemia, which sometimes is called blood cancer, and the lymphomas, which include Hodgkin's disease, increased approximately 20% in the five years 1949-1953, Dr. Shimkin reported.

Minnesota, New York and California had death rates significantly above the average, the Cancer Institute figures show.

Higher income groups seem to have a relatively higher death rate from leukemia.

Search for the cause of leukemia, with the hope of finding measures to prevent it, is now turning to consideration of factors within the body, or host. Seven suspected of influencing leukemia development were reported by Dr. A. C. Upton of Oak Ridge National Laboratory, Oak Ridge, Tenn., and Dr. Jacob Furth of Children's Cancer Research Foundation, Boston. They are genetic factors, immune factors, age, diet, gland or hormone factors, the thymus gland and the bone marrow.

In man, the scientists said, the importance of genetic factors is debatable. The relatively frequent development of leukemia in identical twins points to genetic factors, but the development of leukemia by only one twin in some cases points to the importance of factors other than genetic.

Immune factors may influence the transplantability of experimental leukemias and their pattern and rate of growth. These resistance factors may be modified by cortisone or irradiation.

The relative frequency of the various types of spontaneous leukemias in both man and animals as well as susceptibility to their induction differ with age. The age of the mother or of the foster mother also influences the development of lymphoma in mice; the leukemia incidence of the offspring decreases with increasing maternal age. Thus, a humoral resistance factor, still to be better characterized, is acquired with age.

Caloric restriction curtails the development of lymphomas as of cancers in general.

In humans, leukemia is more common in males; in most strains of mice, in females. The spontaneous development and induction of the disease in mice may be either inhibited or enhanced by sex hormones, depending on genetic factors and on the hematologic type of leukemia.

In man, irradiation of the thymus in infancy has been reported to increase leukemia in childhood; however, localized irradiation of the thymic region in adult mice has been observed not to increase the incidence of leukemia.

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MEDICINE

Predicts 40% Cures of Throat Cancer Soon

► CANCERS of the part of the throat between the mouth and the food tube to the stomach will be cured in 40% of the cases in the next few years, Dr. John V. Blady of Temple University Medical Center, Philadelphia, predicted at the Third National Cancer Conference in Detroit.

By cure is meant five-year survival of the patient after treatment. Until recently, only 10% to 15% of these patients could be saved to live five years.

The better results Dr. Blady predicted will come because these cancers can now be treated surgically, whereas until five years ago X-rays were the primary method of treatment; and because more patients are coming to the doctor for treatment while their cancers are still in the early stage.

Five-year survival rates for cancer of the voice box, or larynx, have already reached 70% in the nearly 1,000 cases seen at the Chevalier Jackson Clinic and the Tumor Clinic at the Medical Center between 1930 and 1955.

This rate includes patients treated by surgery or radiation or both.

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MEDICINE

Sees Progress in Control Of Bone Marrow Cancer

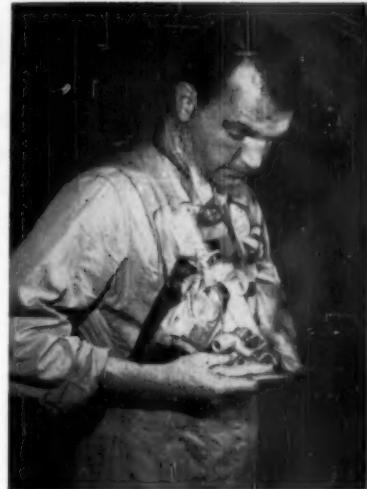
► A HOPEFUL REPORT on bone marrow cancer that is related to leukemia was given by Dr. R. Wayne Rundles of Duke University, Durham, N. C., at the Third National Cancer Conference in Detroit.

"Reasonably rapid progress is being made toward the eventual control" of the disease, he said.

Multiple myeloma is its name. Patients are being helped to live longer and treatment gives "excellent" results in one-third of them, he reported.

Among four new drugs under study, one known only as CB-1248, Dr. Rundles said, "shows definite promise of becoming useful in future treatment of leukemia."

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AUTOMATIC INFLATOR — Expected to become a standard safety feature for life jackets is this device that automatically inflates a pilot's "Mae West" within 15 seconds after immersion in water. George Smith, test pilot at North American Aviation, Inc., demonstrates position of the lifesaving device.

MEDICINE

See Lead to Arthritis Cause in Blood Reaction

► A POSSIBLE LEAD to discovery of the cause of rheumatoid arthritis may exist in a newly discovered reaction between two substances in human blood.

The reaction was announced at the American Rheumatism Association meeting in Chicago by Dr. Wallace Epstein, speaking for a team of scientists at Columbia University Presbyterian Medical Center, New York.

"This advance," Dr. Epstein said, "may now make it possible for us to identify the rheumatoid factor present in the blood of persons with crippling arthritis. It may help us understand a bit better why the person with rheumatoid arthritis is different."

The reaction is between two unknown substances in blood. One of the unknowns is found in persons with arthritis, the other in persons without the disease.

Their existence was discovered when the Columbia scientists combined pooled human gamma globulin with the blood serum of patients with rheumatoid arthritis. The result was formation of an insoluble precipitate.

Next step will be to identify the two substances. The one in pooled human gamma globulin seems to act like an antigen and the one in arthritis blood like an antibody.

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RADIO ASTRONOMY

Planets Emit Radio Waves

Radio astronomers at Naval Research Laboratory discover radio waves from Venus, the first planet from which those of thermal origin have been found.

► MERCURY, MARS and Saturn are expected to be heard from soon by the radio waves they broadcast.

So far only two planets, Venus and Jupiter, have been detected by radio astronomers, but many observations of radio broadcasts by planets are foreseen in the near future.

Besides reflecting light from the sun, planets can emit two frequencies of radio waves picked up here on earth by the giant antennas known as radio telescopes. One frequency results from the planet's heat, absorbed from the sun and radiated into space; the other from motions, possibly thunderstorm-like activity, in the planet's atmosphere.

Jupiter was the first planet discovered to be broadcasting radio waves. They are the type that probably result from large-scale atmospheric disturbances, scientists at Carnegie Institution of Washington reported. (See SNL, April 16, 1955, p. 243.)

Venus is broadcasting both types of radio waves, heat-caused and atmosphere-caused, scientists at the Naval Research Laboratory, Washington, and at Ohio State University have discovered.

Working with the 50-foot, saucer-shaped radio antenna at NRL, Cornell Mayer, Russell M. Sloanaker and Timothy P. McCullough picked up radio waves from Venus at 10,000 megacycles, or a wavelength of three centimeters.

Their measurements showed Venus has a temperature higher than boiling water, or more than 212 degrees Fahrenheit. Optical astronomers have measured Venus temperature as about half that, but their observations are made of the top of the planet's cloud layer. The radio astronomers are probing deeper into the clouds, perhaps to the Venusian surface.

Using a spaced antenna array, Dr. John D. Kraus, director of Ohio State University's Radio Observatory, has detected crackling sounds from Venus somewhat similar to radio static from thunderstorms on earth. The planet, brightest object in the western evening sky, is now rushing toward the earth at the rate of 500,000 miles a day. By June 22, it will reach its point of nearest approach, 27,000,000 miles, then start to recede.

Soon thereafter, the Ohio and NRL scientists are expected to start searching for radio waves sent out by Mars, which will make its closest approach to the earth in more than 30 years on Sept. 7.

Saturn's radio noise, if detectable, is expected to resemble Jupiter's, resulting from atmospheric disturbances. Radio astronomers at Carnegie Institution are considering try-

ing to pick up Saturn's radio waves, but have made no definite plans as yet.

Scientists at the Commonwealth Scientific and Industrial Research Organization, Sydney, are in a better position to tune in on Saturn, since it is quite far south to observe from the Northern Hemisphere. In 1950, Arthur J. Higgs of C.S.I.R.O. predicted Venus might be detected at radio wavelengths, and radio astronomers there have long been leaders in the field.

Discovery of another planet, such as Mercury, Mars or Saturn, broadcasting radio waves might also be made at the National Bureau of Standards' Central Radio Propagation Laboratory, Boulder, Colo. There, Drs. Roger Gallet and Kenneth L. Bowles are now studying radio waves from Jupiter at two different frequencies simultaneously.

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MEDICINE

Hunt Leukemia Cause

► THE IDEA that leukemia in both mice and men is caused by a virus gained support from reports to the Third National Cancer Conference in Detroit.

A "viable (living) agent is responsible for the development of leukemia in both the leukemia susceptible mouse and in human beings," Dr. Steven O. Schwartz of the Hektoen Institute for Medical Research, Cook County Hospital, Chicago, reported.

Material from the brains of patients dying of leukemia, he reported, has shown an accelerating effect on development of leukemia in susceptible mice.

Certain immunologic similarities exist, Dr. Schwartz also found, between the leukemias of mice and those of humans. Leukemia, he thinks, represents the host response of certain tissues to an outside agent, "probably virus or virus-like."

The sites of this response, such as tumor tissue and lymph nodes, are the poorest sources of the inducing agent or virus, while the sites of least response, such as the brain, are the richest sources.

Discovery that mouse leukemia is actually transmitted by a virus was reported by Dr. Ludwik Gross of the Veterans Administration Hospital, Bronx, New York. This finding was described several years ago.

At the conference, Dr. Gross reported that some of the inoculated animals developed, instead of leukemia, tumors of the salivary glands or cancers under the skin.

When filtered extracts were prepared from these tumors and inoculated into

MARINE BIOLOGY

Naval War Declared Against Killer Whales

► KILLER AIRCRAFT are killing killer whales near Iceland.

At the request of the Icelandic government, U. S. Navy patrol aircraft have been dropping depth charges on the mammals, which last year did \$150,000 damage to Icelandic fishing nets from which they stole untold numbers of fish.

The killer whale has no commercial value. The only possible danger seen by commercial fish authorities is that valuable fish may be killed by the depth charges. Although the incidental killing of such fish is confined to Icelandic waters, if the valuable fish were allowed to live, they might migrate to the United States coast.

Killer whales, which are nine to 30 feet long, attack seals, little whales, dolphins and cod. When trawler fleets are out, the killers wait until the big nets are full, then pounce, destroying them and devouring their contents.

Killer whales migrate long distances, so any destruction of them would benefit fishermen over a large part of the world.

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the new-born mice, the same kinds of tumors or even typical leukemia resulted. Under the electron microscope, the filtered leukemia extracts were found to contain innumerable particles, possibly representing the virus.

Dr. Gross now is seeking to determine whether leukemia and the tumors are caused by the same virus or by different, though possibly related, virus.

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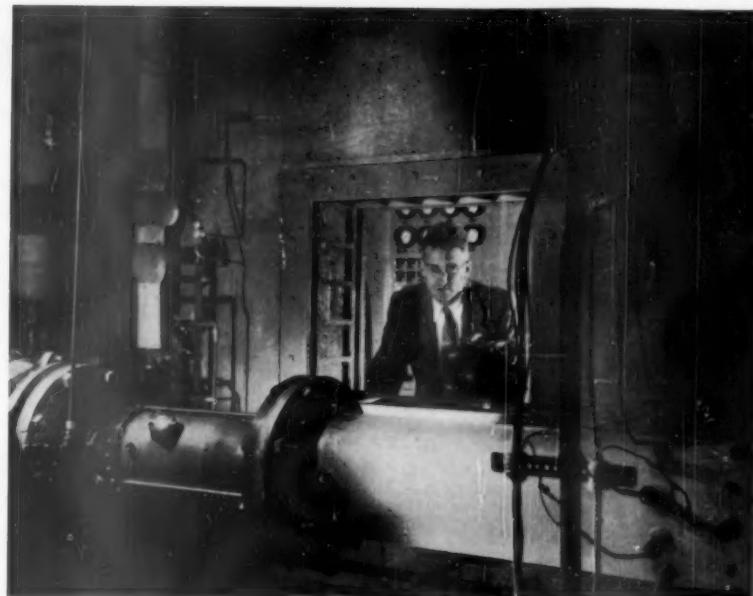
INVENTION

Attachable Range Finder Receives U. S. Patent

► A RANGE FINDER designed to be clipped onto a camera of the twin lens reflex type has won patent No. 2,746,368 for Richard Weiss of Braunschweig, Germany. It is also designed to be used with the direct view finder, when the focusing hood is up.

The attachable range finder can be used when the camera is held either at waist level or at eye level, permitting the camera man to focus even in dim light, Mr. Weiss says. If desired, by using the same principles, a range finder that can be clipped on or removed can also be made for other type cameras. Mr. Weiss assigned the patent rights to Franke & Heidecke, Fabrik Photographic Prazisions-Apparate, also of Braunschweig.

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TEST RUN FOR JET FUELS—A test run on the combustor section of a commercial turbo-prop engine being made in the recently opened jet fuels laboratory of The Texas Company at Beacon, N. Y. Charles M. Kubbach, engineer in charge, watches the glowing exhaust pipe that indicates the intense heat generated by burning fuel in the jet combustor, which is the component with the quartz window, left of the exhaust section.

MEDICINE

Cigarette-Cancer Link

► FURTHER EVIDENCE that cigarette smoking may lead to lung cancer appeared in a report at the Third National Cancer Conference in Detroit.

Definite pre-cancerous and other possibly pre-cancerous changes in the lung tissues parallel to the degree of cigarette smoking were seen in the lungs of 117 men examined after death.

The report was given by Dr. Oscar Auerbach of the Veterans Administration Hospital at East Orange, N. J.

There are causes other than cigarette smoking for lung cancer, Dr. Auerbach said. He pointed out that uranium and chrome dusts and general air pollution have been incriminated as well as cigarette smoking.

If, however, inhalation is a major factor, he said, one would expect to find certain tissue changes in the remaining non-cancerous lung tissue of patients dead of lung cancer and in patients dying from other causes but similarly exposed to potential cancer-causing inhalants.

The changes are basal cell hyperplasia, stratification and squamous metaplasia, which, although not cancerous in themselves, may really be the staging ground for cancer, and definite early cancerous changes. These changes are the ones he found run-

ning parallel to the known smoking habits of the 117 men before death. Of the group, 16 were non- or irregular smokers, 20 were light smokers (less than a pack a day) and 47 were men who had smoked more than a pack a day. Of the 117 dead, 34 who were all smokers died of cancer.

In his studies, he removes the entire tracheobronchial tree so as to examine both the windpipe and the rest of the breathing apparatus for abnormal tissue. In cancer victims, such tissue might be found in areas not directly involved in the cancer.

Similar studies of women and children must be made, Dr. Auerbach said, to complete the picture. His next project is to study separately tissue from those who had lived in cities and those who had lived in the country to see what effect urban air might have had on the breathing tissues.

Assisting in the research, which entailed the microscopic examination of some 29,000 slides, were Drs. Jerome B. Forman, James B. Gere, Gerald E. Maehsman, Thomas Petrick and Harold Smolin.

Science News Letter, June 16, 1956

The average migratory speed of the bluefin tuna is 3.5 knots while moving through the Straits of Florida.

MEDICINE

Arthritic Morning Pain Due to Gland Variation

► THE REASON many arthritis sufferers complain of stiffness in the morning when they wake up may be the fact that their adrenal glands do not put out as much hydrocortisone during the night.

Findings showing this explanation possible were reported by Dr. Joseph E. Warren of the University of Pittsburgh at the American Rheumatism Association meeting in Chicago.

He and his associates measured the amount of the hormone in the blood around the clock at approximately three and one-half hour intervals. They did this on both normal and arthritic persons.

"We found," Dr. Warren said, "that the production of hydrocortisone by the adrenals is at its lowest levels during the early hours of sleep. This low point continues past midnight and may decrease even further by 3:30 a.m. There is then an abrupt rise to the highest concentrations for the day at 7 a.m."

Comparing the normals with the arthritics, Dr. Warren said that, generally, the 3:30 a.m. low of the arthritic was much higher than that for the normal person but, as morning approached, the rise in the arthritic was less than that for the normal person.

"That many rheumatoid arthritis sufferers complain of morning stiffness on awakening," Dr. Warren said, "may be due to the fact that the output of the hormone, hydrocortisone, is lowered during the night. The peak levels of hydrocortisone at 7 a.m., then, could explain the disappearance of the stiffness during the morning and the return of this symptom later in the day."

Science News Letter, June 16, 1956

TECHNOLOGY

Instrument Locates Kidney Stones

► KIDNEY STONES, which are sometimes difficult to locate during surgery, can now be found with a new instrument that produces X-ray-like pictures.

The device was developed by Dr. Donald E. Burke, resident in urology at the University of California Medical Center at Los Angeles.

Dr. Burke calls the device the "Thul-X" because it makes pictures like X-rays, called radiograms, using as an energy source a thulium radioisotope. The pictures produced are technically not X-rays in the usual sense of the word.

During surgery to remove stones in kidneys, it is often difficult to locate the stones exactly. The Thul-X, which is about the size and shape of a small hand microphone can be used rapidly and conveniently to aid precise localization.

It is also thought the device may be useful in fracture surgery, and during surgery for removal of gall stones.

Science News Letter, June 16, 1956

BIOCHEMISTRY

Joined Germs Show Secret of Penicillin

► A SIAMESE TWIN-LIKE JOINING of bacteria is opening to scientists the secret of penicillin's anti-germ action.

Apparently this first of the antibiotic, or mold remedies, stops germs by blocking the germ's production or use of ATP. This chemical, with the long name adenosine triphosphate, exists in all cells as a carrier of energy-laden phosphate.

Discovery of this part of penicillin's action, made by Dr. Robert C. Barnett of the University of Texas Medical Branch, Galveston, was announced by the American Cancer Society, which supports the research.

The Siamese twin-like bacteria were made that way by sublethal doses of penicillin. Under the drug's influence, Dr. Barnett found, a bacterium would divide up to the point where the mother cell became two daughter cells, but the daughters could not pull apart. They were stuck together end to end like Siamese twins.

The Siamese twin daughters in turn could continue to multiply, but neither they nor their progeny could pull apart so long as penicillin permeated the medium in which they were growing.

Dr. Barnett has grown enormous strings of such bacteria. Sometimes 300 or 400 would be stuck together end to end. The scientist found that, if he added to the cultures a bit of ATP, the string promptly broke up into normal individual bacteria.

Science News Letter, June 16, 1956

ACOUSTICS

Conversation Impossible For Jet Carrier Officers

► TO PROTECT THE EARS of an aircraft carrier's captain and other personnel from the noise of future jet planes, an island structure with a sound-proofed double wall is suggested by Dr. A. C. Pietrasanta of Bolt Beranek and Newman, Inc., Cambridge, Mass., after a study for the Navy's Bureau of Ships.

Even at present, it is difficult or impossible for important ship's officers to communicate by talking to each other.

In the future, jets are expected to make much more noise. With both turbojet engines at military power, the present jet airplane develops about 169 decibels, well above the limit of the largest power amplifier system and the threshold of painful noise. Jet planes of the next few years are expected to rise to about 190 decibels.

Most noisy time on a carrier's deck is while a jet plane is running up to full power for a take-off. Although a conventional airplane actually makes more noise at its maximum than a jet aircraft, and although, when the conventional planes take off, they leave every 15 seconds instead of every 30 seconds as do the jets, nevertheless, the noise is "on" more than three times as long during a jet runup

as during a conventional plane take-off. Comparatively speaking, the noise for landing operations is unimportant.

From the point of view of the "island" personnel, the noise from the port catapult is much worse than the noise from the starboard catapult, because the path of worst noise intensity travels out at an angle from the plane's tail.

These paths from the starboard catapult go over the side of the ship or cross it well forward of the island. From the port catapult, one noise pathway is lost over the side, but the other cuts directly through the island where officers are trying to talk.

During normal operations, all the planes in succession take off and land about every one and a half to two hours. On a "strike," operations continue from dawn to dusk and perhaps all night long.

Dr. Pietrasanta's study, reported in the *Journal of the Acoustical Society of America* (May), was made on the U. S. S. Franklin D. Roosevelt.

Science News Letter, June 16, 1956

MEDICINE

Seek Cancer Clues In Lung-Sick Sheep

► CLUES for an attack on lung cancer in humans may come from a study of a cancer-like lung disease in sheep.

The disease in sheep is called pulmonary adenomatosis. It affects the glandular part of the sheep's lung and, in this respect, differs from the commonest human lung cancers that attack the lining of the breathing tubes in the lung.

Because it may be a virus disease, a Yale University cancer virologist, Dr. Francisco Duran-Reynals, has joined Dr. Edwin Jung-herr, professor of animal pathology at the University of Connecticut, in the research.

The sheep lung disease is rampant in such areas as the North American Rocky Mountains, the Peruvian Andes, the South African Veldt, Iceland, the wine country of France and parts of the British Isles.

It becomes apparent in sheep two and three years old, but it could be latent in them since birth. Only in the sheep in Peru is the disease a genuine cancer, adenocarcinoma. But in every country, the disease is contagious and invariably fatal.

It is a disease of the open range—seldom found on farms. In contrast, human lung cancer occurs most often in cities and industrial areas.

The Yale scientist uses conventional as well as several new methods of growing the presumed "lung cancer viruses" by injecting new-born lambs with extracts of affected lungs from diseased sheep. He will also determine whether other animals serve as carriers of the virus.

Human lung tissue affected with pulmonary adenomatosis and even cancer will also be used to see whether they contain a virus transmissible to animals.

The Yale scientist's investigation of the sheep lung disease will be supported by the American Cancer Society.

Science News Letter, June 16, 1956

IN SCIENCE

PLANT PATHOLOGY

Find Carrier of Strawberry Disease

► THE SOURCE of a strawberry disease that spreads mysteriously and makes the plants produce shriveled fruit has been found.

Two species of small insects called leaf-hoppers carry green petal disease from clover to strawberries.

Experiments by Dr. N. W. Frazier of the University of California and A. F. Posnette of East Malling Research Station, Kent, England, indicate the guilty leaf-hoppers are *Euscelis lineolatus* Brulle and *Macrosteles viridigriseus* (Edwards).

The disease, which occurs chiefly in England, has an American counterpart caused by the aster yellows virus. Green petal disease also may be caused by this virus, they report in *Nature* (June 2).

Science News Letter, June 16, 1956

INVENTION

Atomic-Bred Flower Given a Patent

► THE WORLD'S FIRST PATENT for an atomic-bred flower has been granted by the U. S. Patent Office.

The flower is a pure white carnation. It was developed "accidentally" at the Brookhaven National Laboratory, Upton, N. Y., by Dr. Willard R. Singleton, Miller professor of biology at the University of Virginia, and Alan Richter, a graduate student at the University of Wisconsin.

As yet unnamed, the atomic age flower is a mutation brought about by subjecting a carnation known as White Sim to the gamma rays from a cobalt-60 source.

The White Sim, Dr. Singleton said, has its white flower marred by red spots. During the course of experimenting with radiation doses and the color of carnations, the mutation "turned up."

What happened in their "accidental discovery," Dr. Singleton said, is that the red spots of the White Sim were eliminated. It is thought radiation changed the underlying constitution of the carnation from a normal red into white.

Three generations of the flower have been raised and they have all bred true and pure white, Dr. Singleton points out. The new carnation has a flower that is two and one-half to three inches in diameter, is long-stemmed and without thorns.

The flower was awarded plant patent No. 1,481. Dr. Singleton assigned the patent rights to the United States of America as represented by the U. S. Atomic Energy Commission.

Science News Letter, June 16, 1956

E FIELDS

SURGERY

Graft Arteries to Both Kidneys for First Time

► THE FIRST SUCCESSFUL GRAFTING of the main artery to each kidney is announced by Drs. Eugene F. Poutasse, Alfred W. Humphries, Lawrence J. McCormack and Arthur C. Corcoran of Cleveland in the *Journal of the American Medical Association* (June 2).

The patient was a 15-year-old boy who suffered severe high blood pressure as a result of narrowing of both main kidney arteries. When two other patients, a 14-year-old boy and a 23-year-old woman, had died of the same condition, the doctors decided to try the artery grafting in the third patient.

The new arteries grafted to the boy's kidneys came from the hospital artery bank. The grafts were made in two operations two weeks apart. Six weeks after the second operation the boy was well, with his blood pressure over a period of five days staying at 130/76, compared to the 220/120 it had averaged when he first got sick. Both kidneys continued to function normally after the operation.

Three months after the second operation the boy continued to be in good health with normal blood pressure, though he had occasional attacks of abdominal pain.

Science News Letter, June 16, 1956

PHYSICS

U. S. Nuclear Program Is Not Lagging Behind

► THE UNITED STATES' nuclear power program was defended against claims it is lagging behind both Russia and Great Britain at the American Nuclear Society meeting in Chicago.

The United States may be behind on paper projects planned for far into the future, James A. Lane of the Oak Ridge National Laboratory said, but now the United States has already built more reactors than the rest of the world combined. This country has also pioneered in developing techniques leading to several new and different reactors.

Even by 1960, Mr. Lane pointed out, the U. S. will still have at least ten more research and power reactors than Russia, Great Britain and all other countries combined.

Claims the U. S. is lagging, Mr. Lane said, are valid "only if progress is measured in terms of projected nuclear electric capacities. On this basis, the U. S. program with an estimated 900 Mw (megawatt) of nuclear plant capacity by 1960 compares unfavorably with the 2000-2500 Mw capacities projected for the USSR and the 1200

Mw capacity projected for the United Kingdom."

Concentration on technical know-how has made possible three new reactor types that look promising, he said, a dilute solution homogeneous U-235 reactor, a liquid metal fueled reactor and an organic moderated reactor.

The score card on reactors as listed by Mr. Lane showed that, at present, the U. S. has 22 research and test reactors and seven power reactors and power prototypes. Other countries of the world have 15 and one respectively. By 1960, the U. S. will have an estimated 54 research reactors and 37 power reactors. The rest of the world will have an estimated 50 research reactors and 31 power reactors.

Mr. Lane is director of the Oak Ridge reactor experimental engineering division.

Science News Letter, June 16, 1956

MARINE BIOLOGY

Chemical Promises Lamprey Control by 1960

► SCIENTISTS have found an all-season sea lamprey poison which, if adopted for general use, may have the Great Lakes predators under control by 1960, SCIENCE SERVICE has learned.

The new chemical, whose name is still being kept under wraps, is as effective in very cold weather as in warm weather.

Chemists have been looking for a poison that will kill the blood-sucking lampreys without killing valuable fish. They have found only five such poisons from more than 5,000 screened. Four of these, including the seriously considered 3-bromonitrophenol, are sufficiently poisonous only when water temperatures are above 45 or 50 degrees. In colder water, so much poison must be used that fish as well as lampreys are exterminated. (See SNL, June 9, p. 359.)

U. S. Fish and Wildlife officials said the new poison will kill the costly trout-eating lampreys all year, not permitting them to survive during the winter.

If it is put into use soon, conservationists think they will be able to start re-stocking Lakes Michigan and Huron with trout about 1960. Some re-stocking is already underway in Lake Superior.

Scientists have run 1,726 tests on the cold-water chemical at about \$15 a test. University of Wisconsin Alumni Foundation scientists are testing the same chemical on birds and mammals. They have found that the slight amount needed to kill lampreys is harmless to people and livestock.

A way is now being sought to introduce the poison into Great Lakes streams, where the sea lampreys migrate. Five generations of the "vampire eels" normally live in a stream at one time.

The lampreys have killed so many trout in Lake Michigan that, last year, 1,600 miles of gill nets caught only eight of the fish. Before the lampreys moved in during the 1930's, the same number of nets would have caught about 37,000 pounds of trout.

Science News Letter, June 16, 1956

CHEMISTRY

Man-Made Minerals Filter Liquids

► FOURTEEN MAN-MADE MINERALS similar to the natural zeolites have been produced in an effort to learn exactly how such minerals can filter out gasoline-type liquids from a mixture of liquid hydrocarbons.

"Straight-chain" hydrocarbons similar to gasoline are known to pass through tiny channels in natural zeolite minerals, while liquid compounds of more complex structure are held back. This filtering action is believed due to difference in size between the molecules of the complex liquids and channels left in the filtering minerals when water has been driven out of the crystals that make up the zeolite structure.

Beginning with an attempt to synthesize naturally occurring zeolites, scientists in the research laboratory of Linde Air Products Co., Tonawanda, N. Y., have succeeded in duplicating 20 rare natural minerals, making compounds that have the same filtering properties as those dug from the earth.

In addition, the laboratory has produced 14 new minerals of similar type not yet found in nature. The achievement is announced by three chemists, D. W. Breck, W. G. Eversole and R. M. Milton, in the *Journal of the American Chemical Society* (May 20).

The man-made minerals are compounds of silicon and aluminum that, when combined with sodium or calcium, make rock-like materials similar to the zeolites used in water-purification systems. Analysis of the new products by X-rays showed the chemists details of their structure.

Science News Letter, June 16, 1956

PHYSIOLOGY

Tranquilizing Drugs Differ in Brain Effect

► NEW FINDINGS on the mechanism by which various tranquilizing and sedative drugs produce their effect were announced by Drs. Bernard A. Brodie and Parkhurst A. Shore of the National Heart Institute, Bethesda, Md., and Dr. A. Pletscher, guest worker at the heart institute from Hoffmann-La Roche, Inc., Basel, Switzerland.

The good effects of reserpine come through the brain chemical serotonin, the latest findings show.

Of many tranquilizing and sedative drugs tested, only reserpine and two other alkaloid chemicals from the rauvolfia plant caused sedation and affected serotonin. The two that acted like reserpine in these ways are rescinnamine and deserpidine, or rescanesine.

The other chemicals tested included many other rauvolfia chemicals, chlorpromazine, Frenguel, morphine, barbiturate sleeping medicines and scopolamine.

Science News Letter, June 16, 1956

BIOLOGY

Animal Name-Calling

An exciting quiz and story on the strange and curious names man has given to his furred and feathered friends. Males, females and young often have different names.

By HOWARD SIMONS

► PEAS, as we all know, come in pods. But so do walruses and whales.

Human beings travel on trips, but seals travel in trips.

This is not double-talk, or a play on words, but two examples of the many seemingly strange group names man has assigned to his furred and feathered friends. A school of fish and a herd of cattle are familiar group names. Perhaps a pod of whales and a trip of seals are not as familiar, but they are, nevertheless, very correct English.

By the same token, man has taken it upon himself to assign a different name for the male, female and young of the many animals that inhabit the earth with him.

Sometimes, more than one group name has been applied to the same animal. The fabled whale, for example, when found in numbers can be referred to as a gam or a pod or a herd.

The reverse is true too. A flock can mean lions in Africa, sheep in Australia, goats in Ireland and geese in the United States.

Huntsmen Helped

Historically, the professional huntsmen of England during the Middle Ages probably contributed more to the popularization of animal name-calling than any other single group. It was the professional huntsmen who provided game for English tables, and the same professional huntsmen who provided the specific group name for English game.

As their counterparts the world over, the early English hunted and fished more for food than fun. Game was considered part of the country's natural resources.

For these tradesmen of wood and field throughout the world, an animal was not just an animal and a bird a bird. Each species had a sex and an age. Group names and individual names that spelled out sex and age became the huntsmen's "shop talk," his vocational vocabulary.

To many, where a deer was just a deer, it was a doe or a buck or a fawn to the professional, and it still is today.

At the time the huntsmen were busy, another curious thing was taking place in England involving the animals and their relationship to human beings. The English farmer was evolving a unique vocabulary for animals, all his own.

In rustic, agricultural England, animals and birds were too much a part of the every-

day life to be called by their traditional and proper names. A closeness to nature and a closeness between man and animal led the English common people to express their feelings in much more intimate terminology.

They gave first, or given, names to their little friends.

Bouncy squire rabbit became Jack rabbit and crafty Mr. crow, Jim crow. Little Miss wren became known as Jennie and old Mr. Daw, Jack. Likewise, the sparrow was christened Phillip and the kit, Tom.

With time, these personal names began to stick and many are still well-used today. In some cases, the proper name for a species became indistinguishable from its combination with a given first name. It is rare today to hear Mrs. Magpie called just plain pie.

And how many people realize the harbinger of spring was originally known only as the "red breast." Its first name has all

but become its only name and we all know him as Robin.

Folk habits often become part and parcel of the nation itself. This is certainly true of one given name that the early English farmer used around the farm, for today it symbolizes England itself—John Bull.

However, group names are not the only way man refers to animals. With the possible exception of crossword puzzle workers and a few learned specialists, most names of the male, female and young of animals remain a remote and foreign area of information.

Another exception in this area of knowledge is Francis H. Elmore, who is now parkway naturalist at the National Park Service's Natchez Trace Parkway in Mississippi. Mr. Elmore has devoted much time and study to the terms used to describe the individuals of animal groups.

Mr. Elmore points out that, just because the male and female of the walrus are called a bull and a cow, it can not be assumed the young will be called calves. They might be pups, he says, as with the seal, whale and sea lion, or cubs, as with the shark and whale.

The word kitten, Mr. Elmore tells us,



A TRIP OF SEALS—Man travels on trips but seals travel in trips. A trip of seals is a group of seals. This trip of fur seals live on Gorbach Rookery, St. Paul Island, Alaska. Groups of seals are also known as pods. The young seals looking wistfully at the camera are pups, watched over by cows. Male seals are known as bulls and young seals can also be identified as whelps, bachelors, belamers and half bulls.

can mean the young of the skunk, rabbit, otter, hare, beaver, ocelot, cougar or bobcat.

And a squealer is not a young pig, but a young quail.

The same odd rules for the game of animal name-calling that apply to the young also apply to the males and the females of a species. Hen, to most persons, means a female chicken. But, it can also mean the female of fish and lobsters as well as the female canary. The bull and the cow can refer to the father and mother terrapin.

Fortunately, he-bear and she-bear are self-explanatory.

Obviously, Mr. Elmore is an expert in his hobby. How much of an expert are you? There are 50 questions. For each correct answer (see p. 381) allow yourself two points. If your score is 90 or above, you are an expert.

Group I

GIVE THE GROUP NAME OF THESE ANIMALS

(Example: Bees—Swarm)

1. Nightingales	.....	2. Elk	.....
	.....	3. Rooks	.....
4. Foxes	.....	5. Buffaloes	.....
	.....	6. Ants	.....
7. Quail	.....	8. Wolves	.....
	.....	9. Grouse	.....
10. Peacocks	.....	

Group II

NAME THE ANIMAL OF EACH OF THESE GROUP NAMES

(Example: Pod—walrus)

1. nide	.....	2. sounder	.....
4. wisp	.....	3. shoal	.....
	.....	5. cast	.....
7. stand	.....	6. siege	.....
	.....	8. plump	.....
10. gaggle	.....	9. flock	.....

Group III

NAME THE FEMALE OF THESE ANIMALS

(Example: Sheep—ewe)

1. bison	.....	2. fox	.....
	.....	3. goat	.....
4. owl	.....	5. swan	.....
6. hog	.....	7. tiger	.....
8. whale	.....	9. horse	.....
	.....	10. rabbit	.....

Group IV

NAME THE MALE

(Example: Bee—drone)

1. alligator	.....	2. bobcat	.....
4. deer	.....	3. coyote	.....
6. mountain goat	.....	5. duck	.....
9. termite	.....	7. goose	.....
	.....	8. skunk	.....
	.....	10. woodchuck	.....

Group V

NAME THE YOUNG

(Example: bear—cub)

1. beaver	.....	2. chimpanzee	.....
4. elephant	.....	3. clam	.....
	.....	5. fly	.....

.....	6. frog	.....
7. mink	.....	8. ostrich	.....
	.....	9. rhinoceros	.....
10. zebra	.....	

Science News Letter, June 16, 1956

MEDICINE

See Cats Helping Diabetes Study

► CATS can serve humanity by helping doctors learn more about human diabetes, it appears from a report by Drs. J. Busc, K. Gundersen and F. D. W. Lukens of the University of Pennsylvania, Philadelphia, at the American Diabetes Association meeting in Chicago.

When cats are given a synthetic chemical related to anti-arthritis cortisone, they get diabetes, the Pennsylvania scientists found.

The cats develop ravenous appetites and fat bellies, and their limbs get very thin. The diabetes is very mild and slow in developing. These features of the cat disease, the scientists pointed out, should make it especially useful for learning more about the kind of diabetes, with overeating and obesity, that develops in humans.

The synthetic chemical producing the diabetes in the cats is 9 alpha-fluorohydrocortisone.

Science News Letter, June 16, 1956

MARINE BIOLOGY

Eels Travel by Last-Quarter Moon

► WHEN THE HARVEST MOON reaches its last quarter, it shines on thousands of eels swimming toward their mating ground in the Sargasso Sea.

The eels do not depend on the moon for its light. The long, snake-like fish migrate on cloudy nights as well as under clear skies, according to the State Fishery Research Institute of Holland. But the mature fish do migrate mostly at night, and their travels are pretty much confined to the times when the moon is showing its last yellow slit, the Institute said.

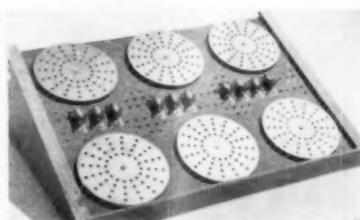
Eels in countries bordering the Atlantic all travel the long journey to the Sargasso Sea, where they mate and die. When the eggs hatch, the young fish make the return trip up the rivers, which usually takes several years.

Evidence suggests that the intensity of eel migration from Holland may be affected by very small earth tremors called microseisms.

Depressions under the North Sea cause these tremors at intervals of about three seconds. Investigations conducted on 1,000 fishing days showed the three-second effect was followed by increased eel catches.

Science News Letter, June 16, 1956

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ART FAKES AND FORGERIES—Fritz Mendax, translated from the German by H. S. Whitman—*Philosophical Library*, 222 p., illus., \$6.00. Telling of deception in the arts from ancient times onward.

THE ART OF THE AQUALUNG—Robert Gruss, translated from "Manuel de l'homme sans poids" by Richard Garnett—*Philosophical Library*, 66 p., illus., \$2.75. This manual, not for the expert diver, but for anyone who would like to explore the undersea world, indicates it is not necessary to be an expert swimmer to enjoy the sport.

BUILD-IT-YOURSELF BOOK FOR BOYS—*Popular Mechanics Press*, 192 p., illus., \$2.50. Directions include those for telephone and telegraph instruments as well as home-made weather instruments.

THE BUKIDNON OF MINDANAO—Fay-Cooper Cole—*Chicago Natural History Museum*, Fieldiana: Anthropology, Volume 46, 140 p., illus., paper, \$4.00. Reporting a study of the life, customs and beliefs of a mountain people of north-central Mindanao in the Philippines.

COMPUTERS: Their Operation and Applications—Edmund Callis Berkeley and Lawrence Wainwright—*Reinhold*, 366 p., illus., \$8.00. Basic information in the new field of automatic computers.

CREATURES OF THE DEEP SEA—Klaus Gunther and Kurt Deckert, translated by E. W. Dickes—*Scribner's*, 222 p., illus., \$3.05. Investigation of the "third dimension," the air above and the water beneath the earth's surface, dates back to the ancient Greeks. Here is a description of life down where light never penetrates.

A DICTIONARY OF DIETETICS—Rhoda Ellis—*Philosophical Library*, 152 p., \$6.00. Nutrition terms from absorption and acerola to zymase.

FROM GENERATION TO GENERATION: Age Groups and Social Structure—S. N. Eisenstadt—*Free Press*, 357 p., \$6.00. An analysis of age groups such as youth movements, etc., with a view to determining the conditions under which they arise.

HANDBOOK FOR SKIN DIVERS—George Bron-

son-Howard—*Arco*, 142 p., illus., \$2.00. Information for the diving enthusiast on this fast-growing sport.

HUNTING WITH THE MICROSCOPE: A Beginner's Guide to Exploring the Micro-World of Plants and Animals—Gaylord Johnson with additions by Maurice Blefield—*Sentinel Books*, rev. ed., 136 p., illus., paper, 95 cents. To introduce young people to the fascinating microscopic world. The book begins with use of an ordinary hand lens.

OUTLINE OF ORTHOPAEDICS—John Crawford Adams—*Livingstone (Williams & Wilkins)*, 423 p., illus., \$7.00. For students and physicians who have occasional contact with orthopedic problems.

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY: Volume 4, Cross Sections Important to Reactor Design—*United Nations (Columbia University Press)*, 357 p., illus., \$7.50.

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY: Volume 7, Nuclear Chemistry and Effects of Irradiation—*United Nations (Columbia University Press)*, 691 p., illus., \$10.00.

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY: Volume 8, Production Technology of the Materials Used for Nuclear Energy—*United Nations (Columbia University Press)*, 627 p., illus., \$10.00.

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY: Volume 9, Reactor Technology and Chemical Processing—*United Nations (Columbia University Press)*, 771 p., illus., \$10.00.

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY: Volume 11, Biological Effects of Radiation—*United Nations (Columbia University Press)*, 402 p., illus., \$8.00.

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY: Volume 15, Applications of Radioactive Isotopes and Fission Products in Research and Industry—*United Nations (Columbia University Press)*, 327 p., illus., \$7.50. Applications include promotion of chemical reactions, sterilization of food, and direct conversion of radiation into electricity.

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY: Volume 16, Record of the Conference—*United Nations (Columbia University Press)*, 203 p., illus., \$5.00. Containing the program, evening lectures, and discussion.

RISK AND GAMBLING: The Study of Subjective Probability—John Cohen and Mark Hansel—*Philosophical Library*, 153 p., illus., \$3.50. The way in which a person will predict the outcome of an event depends on psychological assessment of chance, not on mathematical probability.

A SCIENTIFIC REPORT ON "THE SEARCH FOR BRIDEY MURPHY"—Milton V. Kline, Ed., introduction by Harold Rosen—*Julian*, 224 p., \$3.50. The scientific writers of this report indicate that Bridey is a fantasy.

SOIL CONSERVATION—Sellers G. Archer—*University of Oklahoma Press*, 305 p., illus., \$3.75. Providing answers to the questions that farmers

may ask about preserving and improving their land.

TOMBS, TEMPLES, AND ANCIENT ART—Joseph Lindon Smith, edited by Corinna Lindon Smith—*University of Oklahoma Press*, 349 p., illus., \$5.00. The author, who died in 1950, here gives an account of fifty years of recording, in company with archaeologists, some of the greatest art of antiquity.

Science News Letter, June 16, 1956

BIOCHEMISTRY

Body Can Convert Male Hormone Into Female

► **MALE HORMONE** can be transformed into female hormone in the body.

This feat of body chemistry, which few persons believed could be accomplished until now, may explain why some cancer patients are helped and others hurt by male hormone treatment. Something in the bodies of patients may convert the male hormone into female, so that it harms instead of helping in treatment.

The ovaries in women, cancers of the adrenal glands in men and women, and horse testes are capable of making the male-to-female hormone conversion, Drs. Ralph I. Dorfman and Kenneth Savard of the Worcester Foundation for Experimental Biology, Shrewsbury, Mass., and Drs. Lewis L. Engel and Billy Baggett of Massachusetts General Hospital, Boston, have discovered.

The finding was announced by the American Cancer Society, which supports the research.

Science News Letter, June 16, 1956

GEOGRAPHY

Hillary Would Like to Climb Mt. Everest Again

► **SIR EDMUND HILLARY** said he would like to climb Mt. Everest again, but from the northern (Tibetan) side.

Both Sir Edmund and George Lowe, another member of the successful 1953 Everest expedition, expressed a strong desire to return to the Himalayas once the coming British-New Zealand Antarctic expedition is over.

"I would like to return to the Himalayas with a small party of men who I know would all go well," Sir Edmund said in Wellington, N. Z.

"There is only one thing though . . . I would not want a lot of fuss and bother and would not want to write newspaper dispatches. We would just want to go there and disappear into the blue."

He said he would not want to climb Mt. Everest again over the old route, but would make another attempt from the north.

Sir Edmund said he would not try to get permission from the Tibetan Government.

"Although if permission to approach the mountain from the north was given, I would immediately be interested in an expedition," he said.

Science News Letter, June 16, 1956

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MEDICINE

Cancer Fight Progress

A 17-year survey of cancer patients in Connecticut, unique of its kind, shows definite progress in saving and extending the lives of those afflicted.

► SIGNIFICANT PROGRESS in the fight against cancer is shown in a unique, 17-year-long survey published by the Connecticut State Department of Health.

Steady improvement in diagnosis and treatment are the reasons for the progress against cancer given by Dr. Matthew H. Griswold, chief of the state's division of cancer and other chronic diseases.

The findings are from the Connecticut Cancer Record Register, covering systematic and continuous records for the entire state for the period 1935-1951.

The record is unique in that it is the only known continuous record of all recognized cases of cancer collected from the total population of the state with a lifetime medical follow-up, over so long a period. Both state and federal public health authorities consider it of the utmost value in making epidemiological studies of cancer in the general United States population.

Only one other body of data, compiled by the National Cancer Institute from single surveys of cancer illness in ten large cities in different parts of the country, is of like importance. Abroad, a register of cancer cases almost paralleling that in Connecticut is maintained in Denmark.

Besides showing definite progress in saving and extending the lives of cancer patients, the report tends to corroborate the validity of the five-year survival idea as a reliable index of successful treatment, or of cure of cancer.

Five-year survivals of Connecticut cancer patients increased from 19% in the period 1935-1940 to 25% in the 1947-1951 period for males and from 29% to 38% in the same periods for females.

The records also show that the likelihood of successful treatment and the chances for survival are best when cancer is diagnosed while localized at the site of origin. The study shows that 39% of patients with local-

ized cancer in the 1935-1940 period met the five-year survival index, and this increased to 44% in the 1941-1946 span and 51% in the 1947-1951 interval.

By contrast, in cases where cancer had not been detected early enough but had spread to nearby tissues the five-year survival index increased from 18% to only 22% in these same periods, while the proportion of those with distant spread of their disease remained at about two percent for the whole 17-year period.

Marked improvement is noted in survival rates for cancer of the large intestine, rectum, prostate, thyroid, uterine cervix and main body of the uterus. The report indicates relatively no improvement, however, in survival rates for cancer of the stomach, lung, esophagus and ovary.

Science News Letter, June 16, 1956

Name Quiz Answers

Now that you have taken the quiz on animal names, check your answers. Give yourself two points for each correct answer.

Answers: 1. lark; 2. lark; 3. kitten and chick; 4. lark; 5. maggot; 6. raddle; 7. lark; 8. chick; 9. call; 10. colt; 11. lark; 12. chick; 13. raddle; 14. lark; 15. maggot; 16. raddle; 17. lark; 18. chick; 19. call; 20. colt.

Group V

Answers: 1. tom; 2. dog; 3. dog; 4. buck or porker; 5. pony; 6. sow; 7. pony; 8. boar; 9. king; 10. he-

Answers: 1. cow; 2. vixen; 3. fox or bitch; 4. pony; 5. hawk; 6. horns; 7. dog; 8. wolf; 9. deer; 10. doe or puss.

Group VI

Answers: 1. hawks; 2. hawks; 3. hawk; 4. pony; 5. hawk; 6. horns; 7. dog; 8. wolf; 9. deer; 10. doe or puss.

Group VII

Answers: 1. hawks; 2. hawks; 3. hawk; 4. pony; 5. hawk; 6. horns; 7. dog; 8. wolf; 9. deer; 10. doe or puss.

Group VIII

Answers: 1. watch; 2. gang; 3. colt; 4. slukk; 5. tools; 6. broad; 7. bevy; 8. pack; 9. broad; 10. muster.

Science News Letter, June 16, 1956

SURGERY

Plastics Help Cure Cancer of Throat

► SOME CANCER PATIENTS are getting what might be called a plastic throat to replace what had to be cut out because of cancer. As a result, increasing numbers of them are being cured.

How this use of a "cheap and readily available product of the plastics industry" is helping the cancer fight was reported by Dr. H. Mason Morfit of the University of Colorado School of Medicine, Denver, at the Third National Cancer Conference in Detroit.

When cancer strikes the throat, larynx or upper esophagus, so much tissue must be removed when the cancer is cut out that surgeons have had trouble restoring continuity of the digestive tract. Dr. Morfit pointed out. These regions are where food must be swallowed and started on its way through to the stomach.

Thanks to use of artificial materials, 11 patients can now eat normally after having their cancers cut out.

Besides polyethylene plastic, a pliable fine stainless steel mesh or vitallium mesh covered with a skin graft from other areas of the patient's body have been used.

Antibiotics, blood banks and modern anesthesia methods are also helping improve the cure rate for patients with these cancers.

Science News Letter, June 16, 1956

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PUBLIC HEALTH

Parrot Fever Increasing

► PSITTACOSIS, a pneumonia-like disease transmitted from some birds to humans, has hit about 15 times as many persons during 1954 as in the years prior to 1951.

Doctors at the U. S. Public Health Service in Washington blame the increase on parakeets' popularity as pets.

From 1945 to 1951, the number of cases in the United States annually ranged from 25 to 35. In 1952, the figure jumped to 135 and, at the end of 1954, 563 cases had been reported for the year. Two hundred of these resulted from an epidemic among Texas turkeys, leaving 363 to be blamed on other domestic fowl and pets.

The disease, commonly called parrot fever, occurs most frequently in parrots and related tropical birds. Public Health Service regulations prohibit importing such birds from outside the United States for sale or trade.

Travelers can bring in two birds a year as pets only if the birds have been with their owners four months or longer.

Restrictions on interstate transportation of parakeets were relaxed in November, 1951, because the law was difficult to enforce and, according to Public Health officials, many states lost interest in it. Since then, there has been a surge of interest in raising and breeding parakeets.

No sure-fire vaccine has been developed to protect parakeet owners against psittacosis. Reports of new cases reach public officials every week. Last March four persons in one North Carolina family caught the disease from two parakeets. A customs agent caught parrot fever when he impounded birds smuggled into this country.

A slight drop in the number of cases in 1955 has been offset by a gain in the number so far this year.

Some non-tropical North American birds carry psittacosis, including turkeys, pigeons and ducks. The disease is not so common among these birds, however, and wild birds are less likely to pass it on to people because they seldom come in contact with humans.

The virus appears in diseased birds' waste. Anyone cleaning the cage of a sick parakeet or parrot is exposed to psittacosis.

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A bird may have the disease if it seems sluggish, has ruffled feathers and frequent diarrhea.

Bird feed is sometimes treated with aureomycin to keep psittacosis from developing, but scientists are not sure just how effective this is.

In humans, parrot fever seems much like pneumonia, and is curable with antibiotics.

Science News Letter, June 16, 1956

PUBLIC HEALTH

Piggery Workers Get Dog Disease

► PIGGERY WORKERS and apparently the pigs can get a dog disease known as canicola fever, Drs. H. E. Seiler and J. Norval of the Edinburgh Public Health Department in Scotland and Miss Joyce D. Coghlan of the University of Edinburgh have discovered.

Canicola fever is caused by a spiral germ called leptospira. Some members of this germ family cause the serious and sometimes fatal Weil's disease.

The fact that humans can get the dog form, canicola fever, has been known for some time. The surprising thing about the Edinburgh piggery workers, however, was that, although they had the dog forms of the germs, they had not had contact with any but healthy farm dogs.

The germs must have gone from infected dogs to the pigs and then to the piggery workers, the Edinburgh scientists suggest in *Nature* (June 2).

Science News Letter, June 16, 1956

INVENTION

Scientists Find Way To Purify Metals

► TWO SCIENTISTS have invented an apparatus for producing purified metals by thermal reduction or decomposition of metal compounds.

The device and process means the production of purified metals such as zirconium in massive bodies and elongated rods. Purified metals are becoming increasingly important in the manufacture of fuel rods and other parts of atomic reactors.

The metal purifier can be used to produce those metals whose halide vapors are susceptible to thermal decomposition, such as zirconium, hafnium, titanium, silicon and vanadium.

It is the invention of Dr. Zalman M. Shapiro and Jack McDonald of the Atomic Power Division of Westinghouse Electric Corporation, Pittsburgh, Pa. Awarded patent No. 2,739,566, the scientists assigned the patent rights to the United States of America as represented by the Atomic Energy Commission.

Science News Letter, June 16, 1956

BIOLOGY

NATURE RAMBLINGS

by Horace Loftin



"Flying Lizards"

► MILLIONS OF YEARS AGO when the giant dinosaurs still dominated the earth, some of the smaller reptiles began to take to the air on membranous, bat-like wings. These were the first of the animals with backbones to develop true flight, as opposed to mere gliding.

Such a "flying lizard" was the pterodactyl shown here.

Although true birds with feathers and warm blood did not originate from the pterodactyls themselves, others of the "flying lizards" were probably ancestral to both. In any event, the modern birds did descend very directly from the reptiles in the course of evolution.

In a sense, the color of bird eggs might be taken as a kind of yardstick of how far removed a bird's living conditions are from ancestral reptiles. The reptiles usually lay their eggs in dark holes or under rotting vegetation or sand. Thus there is little need for protective coloration of the eggs, and it is not surprising most reptile eggs are white or parchment-colored.

Unlike reptiles, birds are warm-blooded, and the eggs must be incubated by the parent bird. The eggs, then, could not be buried and forgotten, but had to be laid more or less in the open where the parents could find them. The earliest birds to emerge from reptile stock probably laid their eggs on the earth without much thought to nests, such as with many gulls and terns.

The development of color spots in the eggs, acting to camouflage the eggs by blending them with the color of the ground, became important to survival. Gulls and terns today have such eggs.

Later, as birds began to build more and more complicated nests, hiding the nest became more important than hiding the eggs. As a result, egg color lost much of its "survival value," while the tendency for eggs to have pigment persisted.

Today most of the feathered songsters have brightly colored eggs of solid and speckled hues, marking the "advance" of birds from the reptiles.

Science News Letter, June 16, 1956

PHYSICS

Atomic Arsenal on Rails

Suggest "Atomic Flyer" be built to travel around the country. Its deadly radiation would be used to fight the nation's destructive agricultural pests where they occur.

► AN ATOMIC ARSENAL on rails designed to fight the nation's destructive agricultural pests was proposed to the American Nuclear Society meeting in Chicago.

As a mobile railway irradiation station, the proposed "Atomic Flyer" could be used to treat potatoes on Long Island to keep them from sprouting; process citrus fruits in the Southwest and curtail the Mexican fruit fly infestation; increase the shelf life of seafood in the maritime states and sterilize in the Midwest the insects in grain and cereal that annually eat their way through \$3,000,000,000 worth of food.

The preliminary design is already completed, Dr. Lloyd L. Brownell of the University of Michigan reported. It is hoped, he said, the 173-ton unit can be built by industry or the Government and placed in operation "within two years."

The Michigan engineers have estimated the radiation train would cost \$93,400 to build and \$114,000 a year to operate. The rolling station could handle from one-half to 11 tons of food an hour, depending on the dosage required. The cost of treatment per ton would range from \$2.55 to \$40.80.

How much air is exchanged between the stratosphere and the troposphere might be discovered by using radioactive tracers, L. Machta of the U. S. Weather Bureau, Washington, reported.

Both natural and man-made radioactive tracers have an important place in the study of the weather, he said. One project the meteorologist suggested was releasing the tracer, tritiated methane, at 70,000 feet in the stratosphere.

The substance could then be searched for at the ground from pole to pole. By this method, Mr. Machta said, it may be possible to tell how fast air in the stratosphere and troposphere mix and where the mixing is most effective.

Radioactive tracers could also play an important role in the study of air movements through jet streams, mixing of air from above the Antarctic continent, local sources of moisture for rainfall, and hurricanes.

The way in which "mock-iodine" and "phantom" patients are saving lives was described by Dr. Marshall Brucer, chairman of the medical division of the Oak Ridge Institute of Nuclear Studies, Tenn.

Radioactive iodine, Dr. Brucer explained, has proven useful in both medical diagnosis and treatment of thyroid disorders, but its uptake by the thyroid is still "highly variable." In order to standardize techniques, the Oak Ridge scientists have devised a "mock-iodine" made of a mixture of radioactive barium and cesium and tried it on

"phantoms," a set of full-sized half-body mannequins.

The "mock-iodine" is used because it has a useful life of over ten years instead of radioactive iodine's eight-day half life.

Scientists throughout the country, he said, are being sent these dolls in an informal survey to determine the variability of uptake by the thyroid in order to develop acceptable standards for the safe treatment of patients.

Science News Letter, June 16, 1956

CHEMISTRY

Color Test For Tobacco

► COLOR, not taste, will soon be the standard experts use to judge tobacco.

A color comparison test, which permits scientists to judge the quality of tobacco while it is still growing, speeds up the process of breeding high-quality tobacco plants. The U. S. Department of Agriculture scientists who discovered the new method expect it to produce better tasting tobaccos.

The tests will enable plant breeders to develop strains of tobacco that do not have unwanted alkaloids. Until now, breeders have had to wait until tobacco has been aged, manufactured into cigars or cigarettes, and "taste tested" before undesirable alkaloids could be discovered.

Using the technique of paper chromatography, scientists can identify alkaloids in tobacco plants. Added color-reactant chemicals show the position and amount of each alkaloid present.

Science News Letter, June 16, 1956

Questions

ANTHROPOLOGY—How might an anthropologist studying U. S. residents for the first time describe them? p. 372.

□ □ □

BIOLOGY—What is a trip of seals? p. 378.

□ □ □

MEDICINE—Why is arthritic pain believed worse in the morning? p. 375.

□ □ □

PUBLIC HEALTH—How much do tests for syphilis cost? p. 372.

□ □ □

RADIO ASTRONOMY—In what two ways can planets broadcast radio waves? p. 374.

□ □ □

VITAL STATISTICS—What is the peak hour for baby births? p. 371.

□ □ □

PHOTOGRAPHS: Cover, National Institutes of Health; p. 371, Carnegie Institute of Technology; p. 373, North American Aviation, Inc.; p. 375, The Texas Company; p. 378, V. B. Scheffer and Fish and Wildlife Service; p. 384, DuPont Co.

MEDICINE

Age of Arthritis Start May Relate to Gland Age

► AGE may influence production of hormones by the adrenal glands. This may explain why the signs of the rheumatic diseases may vary with different age groups.

This possibility was suggested by Dr. Edward R. Hughes of the University of Utah College of Medicine, Salt Lake City, at the meeting of the American Rheumatism Association in Chicago.

The concentration of adrenal hormones, he found, is "significantly higher" in the blood of infants than in that of children or grown-ups.

Science News Letter, June 16, 1956

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Science News Letter, June 16, 1956

❷ **ROLL-UP PIPE** reduces irrigation costs. The flexible gated tubing fitted with adjustable flow controls to distribute water between plant rows can be moved when desired. Made of black-pigmented polyethylene plastic, a 300-foot length of the seamless 12-inch tubing weighs 95 pounds.

Science News Letter, June 16, 1956

❸ **STATIC-CONDUCTIVE SHOE** discharges static electricity as rapidly as it is generated. Designed to reduce the danger of explosions, the shoes have vinyl plastic soles that meet safety codes for conductive footwear. They are also chemically resistant.

Science News Letter, June 16, 1956

❹ **LIGHTWEIGHT WADERS** for Isaac Waltons can be folded small enough to be packed into a tackle box. The latex waders, shown in the photograph, weigh only two pounds, are made in one piece and have shaped stocking feet. They will resist un-



derwater snags, but give complete freedom of movement. The shoulder straps are made of nylon and are adjustable.

Science News Letter, June 16, 1956

❺ **UNIQUE NUT** tightens instead of loosening under vibration. A British product,

the nut is designed so that vibration increases pressure and tightens the especially-made nut. It may be unscrewed or adjusted whenever required.

Science News Letter, June 16, 1956

❻ **ANTI-FLOODING PEN** is prevented from leaking ink whether it is carried over a mountain in an airplane or up a mountain in a pocket by having the ink supply locked in by a rear end valve. The same valve can be opened for filling. The squeezable barrel is transparent.

Science News Letter, June 16, 1956

❼ **CAR DIARY** can be fastened to the automobile's sun visor. Mileage, gas and oil consumption and other expenses can be kept for the record. Entries can be made on a replaceable roll tape that lasts for one year. An extra refill is included.

Science News Letter, June 16, 1956

❽ **LAUNDRY ACCESSORY** to help the busy housewife is a steel iron rest that can be attached to the ironing board end. Resting on plastic feet, the iron holder measures 12½ by 7½ inches. It is designed so that an iron can be slid onto it, eliminating lifting.

Science News Letter, June 16, 1956

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Do You Know?

Fish grow more rapidly in clear waters.

A bushel of wheat yields enough flour to make about 66 one-pound loaves of white bread.

Besides Rocky Mountain spotted fever, ticks are known to transmit tularemia, a disease of rabbits, to man.

Until recently, almost a quarter of the entire population of India suffered from malaria, resulting in 2,000,000 deaths annually from the disease.

In Argentina, the area sown to the sunflower seed crop is now officially estimated at 3,410,000 acres.

Nuts and bolts, nails and washers, wood, rope, stones, rocks, clods of earth, tumbleweeds, and even prairie dogs, all have been removed from jet engines by Air Force maintenance men.

Permanent damage is done to respiratory systems by each non-fatal exposure to polluted air.